REMARKS

Claims 1-9 have been cancelled. Claims 13 and 16, which formerly depended from claims 1 and 5, respectively, have been amended to be in independent claim format. New claims 20 - 23 have been added. Support for new claim 20 can be found at page 4, lines 9-13; page 8, lines 10-15; page 9, lines 6-9; and original claim 1. Support for new claim 21 can be found at page 7, lines 7-9. Support for new clam 22 can be found at page 4, lines 9-13; page 8, lines 10-15; page 9, lines 6-9; and original claim 5. Support for new claim 23 can be found at page 7, lines 7-9 and page 18, lines 4-7. No new matter has been introduced by these amendments. Reconsideration of this application as amended is respectfully requested.

Rejections Under 35 U.S.C. § 102(b)

Claims 1, 2, 4-6, 8-9, and 13-19 stand rejected under 35 U.S.C. 102(b) as being anticipated by Jose-Yacaman et al., Appl. Phys. Lett. 1993 (hereinafter "Jose-Yacaman") with Ohta et al., U.S. Patent No. 5,489,477 (hereinafter "Ohta"), and Nolan et al., U.S. Patent No. 5,965,267 (hereinafter "Nolan") cited for inherent properties. The Examiner states that Jose-Yacaman discloses carbon nanotubes of rolled graphitic planes, which are compared to the Iijima Nature (1991) product. The Examiner also states that the fiber of Jose-Yacaman contains hydrogen based on the disclosure of Nolan. The Examiner acknowledges that the nanotubes of Jose-Yacaman are spiral.

The rejections of claims 1, 2, 4-6 and 8-9 have been obviated by the cancellation of these claims. The Applicant respectfully traverses the above rejection of claims 13-19 by stating that neither Jose-Yacaman, Ohta nor Nolan teach or suggest all of the claimed elements of the present

invention. Claims 13-19 include the limitation that the carbonaceous nanotube comprises disordered layers of carbon material that include hydrogen. This provides a unique combination of structure, wettability, and chemical reactivity. Support for the added limitations can be found in the specification at page 8, lines 10 - 13.

Nolan discloses that hydrogen is present in the catalytically formed nanotubes of Jose-Yacaman. Col. 1, ll. 63-67, col. 2, ll. 1-6. Nolan presupposes that the structure has "exposed carbon lattice edges" that are "capped by hydrogen atoms". Col. 1, ll. 47-53, col. 2, ll. 2-6. Ohta discloses a method of bonding hydrogen to "the dangling bonds" on the cut sections of the nanotubes. Col. 5, ll.61-65. Nolan and Ohta do not disclose a disordered layer of carbon and hydrogen atoms, which have superior wettability and chemical reactivity. Nolan and Ohta disclose ordered carbon lattices with hydrogen capping bonds exposed at the edges of the nanotubes. The improved wettability and chemical reactivity properties of the carbonaceous nanotubes of the present invention are conferred by disordered layers in which the carbon lattice is disturbed. See, for example, page 8, lines 21-24: "[B]ecause the carbonaceous nanotube of the present invention has hydrogen atoms, there is a disturbance in the hexagonal lattice surface construction of graphite. This disturbance in the hexagonal lattice surface construction generates a disordered layer construction part, generating chemical active sites." The prior art discloses hydrogen-capped free edges in which the carbon lattice is intact.

Furthermore, with regard to claims 16-19, none of the references discloses a fiber aggregate comprising a carbonaceous nanotube having a disordered carbon and hydrogen layer.

Rejections Under 35 U.S.C. §§ 102(a) and 103(a)

The Examiner has rejected claims 1-2, 5-6, 13-14, and 16-17 under 35 U.S.C. § 102(a) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,916642 (hereinafter "Chang"). According to the Examiner, Chang discloses copper inside a hollow nanotube. Claims 1-9 have been cancelled thus obviating this rejection as to claims 1-2 and 5-6. The Applicant respectfully traverses the above rejection of claims 13-14 and 16-17 by stating that Chang does not teach or suggest all of the claimed elements of the present invention.

Chang is directed to nanotubes filled with a material such as copper or germanium. Chang describes carbon nanotubes having inner or outer tube diameters of 1 to 500 nanometers, which are produced by the arc discharge method. In the course of producing filled nanotubes, Chang discloses that "long hollow carbon nanotubes" containing copper are formed. Chang also discloses that multiple layers can form the tube wall. Chang's nanotubes "need to be made of layered material such as graphite" and have hydrogen atoms bonded to the carbons at the edges of the graphite sheets (see Chang col. 3, lines 53-54 and col. 4, lines 30-34). Chang does not meet the "plurality of disordered, annular, tube-shaped layers" limitation of claims 13-14 and 16-17 because Chang does not disclose the presence of hydrogen within the carbon sheets, which results in a disordering of the carbon lattice structure.

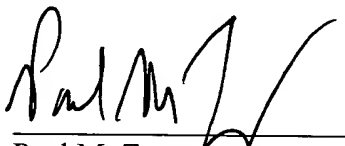
Disordered layers are an important feature of the nanotubes of the present invention because the disordered structure results in increased wettability and chemical reactivity. The disordered layers limitation distinguishes these claims from Chang because Chang's tubes are comprised of graphite, which has an ordered, lattice structure. Chang does not provide any motivation or suggestion to modify the ordered graphite layers of Chang's nanotubes to a disordered layer construction. Further as to claims 16-17, Chang does not disclose or suggest a fiber aggregate comprising nanotubes having a plurality of disordered layers.

CONCLUSION

In view of the foregoing, the Applicant respectfully requests the withdrawal of the above rejections. It is respectfully requested that the application be reconsidered and that all pending claims be allowed and the case passed to issue.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Respectfully submitted,



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